FINAL DRAFT

M E M O R A N D U M

To: National Renewable Energy Laboratories

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Re: Residential Financing Options for Solar Power in Salt Lake County, Utah

As part of our engagement with the National Renewable Energy Laboratories conducting the Salt Lake County Solar America Residential Finance Study, we have drafted this report summarizing the tools and mechanisms available for residential solar projects. These include the financial incentives available, possible financing models that could be used in the County, and a review of the community-scale solar project in St. George, Utah. We have also provided cost estimates for each system. [1]

As shown in the results contained in Table 1, the most economic method of obtaining residential solar installations is a rooftop system owned by a third-party and leased to the resident. If a utility rebate (or equivalent rebate from another source) is received, the net levelized cost[2] approaches zero, assuming the project is put in place during 2009 and the third-party owner is able to claim the bonus depreciation tax benefit. A net levelized cost of zero means that the solar project adds virtually no additional cost for the resident.

The next best case financially would be a community solar farm owned by a third-party which sells power to a municipal utility such as the Murray City Municipal Utility

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[1] Energy Investor Advisors, a sub-contractor of Ballard Spahr Andrews & Ingersoll LLP, performed the financial modeling for this project, the results of which are summarized in Tables 1A and 1B.

[2] Net levelized cost is the cost of the average kWh of electric output throughout the life of the system, above what a residential customer would be expected to pay to their current utility provider, for the life of the system, and incorporates the incentives described in each specific case in this report. If the net levelized cost is $0.00 then the system would be expected to cost exactly the same as the expected utility costs a resident would pay during the time the system is expected to generate power, and a negative number represents an expected savings from anticipated utility costs.

("Murray Utility"), which utility then sells the solar power to residential customers through a program similar to Rocky Mountain Power's Blue Sky Program. This structure enables the project to benefit from the full Federal tax benefits, but would be available only to Murray Utility customers. Utilizing a New Markets Tax Credit financing structure would reduce the cost further.

Each of these models should be possible under current legal and regulatory guidelines in Utah. Current Utah incentives and rules do, however, limit the options available for residential solar development in Utah. Each of the models assumes a 3.5% annual escalation rate. If the utility rates grow faster than 3.5%, the benefits would be greater, and vice-versa.

1. Financial Incentives Currently Available

(a) Residential Federal Tax Credit (Internal Revenue Code § 25D)

(i) **Individual Credit** – under Federal law, individuals may receive a tax credit equal to 30 percent of qualified solar electric property expenditures made by the taxpayer each year. The credit may be carried forward to the following year if the taxpayer is unable to use the full credit in the year they become eligible.

(1) **Eligibility** – To be eligible, the solar electric property expenditure must be "property which uses solar energy to generate electricity for use in a dwelling unit located in the United States and used as a residence by the taxpayer." (Internal Revenue Code § 25D(d)(2)). Building-integrated solar property such as solar shingles explicitly qualify for the credit as well.[3] Taxpayers are justified in relying on a manufacturer's certification that the property meets the technical requirements to receive the credit.[4]

(2) **Multifamily applicability** – the code section has specific provisions for tenant-stockholders in housing cooperatives that install solar power and for condominium owners whose condominium management association invests in solar power. In each of those cases, the homeowner is treated as having made their proportionate share of the expenditures required to install the systems.

(3) **Reduction in Property Basis** – if the credit is taken for solar property investment, the basis of the solar property shall be reduced by the amount of

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[3] Internal Revenue Code § 25D(e)(2) states that "No expenditure relating to a solar panel or other property installed as a roof (or portion thereof) shall fail to be treated as property described in paragraph (1) or (2) of subsection (d) [the section defining qualified solar electric or water heating property] solely because it constitutes a structural component of the structure on which it is installed."

[4] *See* Internal Revenue Bulletin 2009-19, Notice 2009-41, May 11, 2009. The notice also states that a taxpayer is not required to attach a manufacturer's certification statement to their returns, but should maintain records to justify their claim.

the credit. This may also apply if the solar property adds to the basis of the real property on which it is installed, for tax purposes.

(4) **Limits** – although there was previously a cash benefit limit for solar power projects of $2,000 per system, that limit has been removed.

(5) **Deadline** – this credit has been extended through December 31, 2016.

(ii) **Applicability to Salt Lake County** – because there is no limit on the size of the project and no allocation cap for this credit in terms of the total amount of individuals who may claim the credit, every residential installation in Salt Lake County should be able to benefit from the Internal Revenue Code § 25D Federal tax credit for residential solar installations. If a system is owned by a third-party, Internal Revenue Code § 48 would apply, and the accelerated depreciation benefits available under Internal Revenue Code section§ 168 would also apply. If the system is installed in 2009 and owned by a third-party able to claim the depreciation benefit, an additional 50% bonus depreciation is also available as a result of the recent stimulus bill. (*See* American Recovery and Reinvestment Tax Act § 1201).

(b) Federal Investment Tax Credit – under Internal Revenue Code § 48, a 30% investment tax credit is available for solar property placed in service if the property is either constructed by the taxpayer or if the property is acquired by the taxpayer, the original use of the property commences with the taxpayer, and depreciation is allowable for the property.

(c) Accelerated Depreciation and Bonus Depreciation – commercial entities may also claim accelerated depreciation (solar energy property may be depreciated over 5 years rather than the life of the system) or an additional 50% bonus depreciation if the property is placed in service by Dec. 31, 2009. (*See* Internal Revenue Code § 168).

(d) State Incentives

(i) **State income tax credit** – individual taxpayers may qualify for a nonrefundable tax credit equal to 25 percent of the reasonable costs of each residential energy system, including installation costs, against any income tax liability of the claimant, up to $2,000 per residential unit. The credit may be carried forward for four years, if needed. The credit has a unique provision in that it may be claimed by a residential customer that is leasing the solar property, as long as the lessor irrevocably elects not to claim the same credit. In the case of a lease, only the principal recovery portion of the lease payments, excluding interest charges and maintenance expenses, is eligible for the tax credits. (*See* Utah Code § 59-10-1014(5)(a)). Additionally, Utah has a solar-specific provision that was passed in 2008, that allows taxpayers to qualify for this credit if they purchase a solar project from a qualifying political subdivision. Cities, towns, Interlocal entities,[5] and special service districts[6] are all

[5] Created under Title 11, Chapter 13, Interlocal Cooperation Act.

[6] Created under Title 17A, Chapter 2, Part 13, Utah Special Service District Act.

qualified political subdivisions. *See* Utah Code § 59-10-1024. This provision would apply to community solar farms such as the St. George project described below.

(1) **Applicability to Salt Lake County** – for smaller systems, the Utah state income tax credit is a substantial financial benefit, resulting in as much as a 25% discount in the installed system cost for a residential PV system.[7] Because the state law applying this credit allows for the systems to be located off-site from the residence under some circumstances, the credit is available for community solar farms such as the St. George community solar farm program as well as residential systems installed on-site and systems owned by a third-party and leased to a residential homeowner.

(ii) **Property Taxes** – The Salt Lake County Assessor's office confirmed that, for residential properties, solar panels are not assessed for either personal or real property taxes, even though the Utah Constitution, Article XIII, Section 2, requires "All tangible property in the State, not exempt under the laws of the United States, or under this Constitution, shall be taxed at a uniform and equal rate in proportion to its value to be ascertained as provided by law."[8]

(1) **Applicability to Salt Lake County** – commercial solar PV systems are assessed personal property taxes beginning in the first year of ownership, and the taxes reduce the financial benefits of the systems substantially. Residential systems in Salt Lake County enjoy a financial advantage relative to larger commercial systems because of the lack of property tax assessments on residential systems.

(iii) **Net Metering** – the new net metering policy announced by the Public Service Commission on February 12, 2009 results in reimbursing customers for their energy usage and makes energy usage patterns irrelevant to the financial benefits of the systems. For example, in a recent order, the Public Service Commission of Utah modified the net metering policy for residential accounts in Utah.[9] The Commission sets Rocky Mountain Power's cap for net metering cumulative generating capacity at 20 percent of the 2007 peak demand, increased from the 0.1 percent of 2007 peak demand that was identified in Utah Code § 54-15-103(2)(a).[10] Under the order, RECs generated by residential solar power systems are

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7 For example, if the installed cost for a 1 kW system was $8,000, the tax credit would be 25% of the cost, or $2,000, the maximum amount allowed, resulting in a net cost of $6,000. If a 2 kW system were installed for $15,000, the credit would still be $2,000, or 13% of the cost, still a substantial discount, resulting in an installed cost of $13,000.

8 On May 22, 2009, Tim Noyce from the Salt Lake County Assessor's office confirmed that, for residential properties, neither real nor personal property taxes are levied on solar power property. Title 59, Chapter 2 of the Utah Code, the Property Tax Act, contains provisions related to levying and collecting taxes on both personal and real property.

9 In the Matter of the Consideration of Changes to Rocky Mountain Power's Schedule No. 135 – Net Metering Service, Docket No. 08-035-78, Issued February 12, 2009.

10 Although the cap was increased, reference to it in the tariff was removed.

owned by the customer. The rate paid to net metering customers is based on a kilowatt-hour credit method, with the customer having their bill reduced by the number of hours of excess electricity generated, at the retail billing rate. As of late February, only 320 Rocky Mountain Power customers were interconnected and eligible for net metering, with a total installed capacity of 656 kW (an average of about 2 kW per home).[11] The Rocky Mountain Power net metering tariff may be found here: http://www.rockymountainpower.net/Regulatory_Rule_Schedule/Regulatory_Rule_Schedule19267.pdf, and the residential tariffs may be found here:

http://www.rockymountainpower.net/Regulatory_Rule_Schedule/Regulatory_Rule_Schedule2263.pdf and here: http://www.rockymountainpower.net/Regulatory_Rule_Schedule/Regulatory_Rule_Schedule2264.pdf.

(1) **Applicability to Salt Lake County** – this is an important financial consideration because it ensures that residential customers will be fully compensated for actual power savings resulting from the system generation, a majority of which occurs during either the peak season (if the customer is billed on a seasonal peak rate schedule of May-Sept), or the peak hours of the day (if the customer is billed on a pilot time-of-day usage rate schedule). Since the costs to the resident of a solar project are typically fixed, or escalate at a pre-determined rate that is less than the expected future electricity rate increases, the value of the electricity savings under the recently announced net metering policy for Rocky Mountain Power residential customers may be greater than the currently expected costs of the power, resulting in additional financial benefits to residential solar power systems.

(iv) **Limited Utility Rebates** – in Salt Lake County, Rocky Mountain Power offers a financial rebate for its customers to install solar photovoltaics. Rebates of $2.00 per watt (AC) are available to all customer classes through Dec. 31, 2011, though the program is extremely limited, with a total capacity of only 107 kW (57 kW for residential, 50 kW for non-residential) per program year. The 2009 application period is currently closed, but customers may apply to be placed on a waiting list. The system must meet certain technical requirements, and must be grid-connected, net metered, and installed by a qualified Utah electrical contractor. The renewable energy certificates equal to the amount purchased by the rebate must be transferred to Rocky Mountain Power. There is no minimum system size to participate, and the maximum rebate available to a residential system is $6,000 (for a 3 kW system) and commercial rebates are limited to $30,000 (for a 15 kW system). Additional program information is available at: http://portal.ecosconsulting.com/rmp_solar/.

(1) **Applicability to Salt Lake County** – since only about 28 residential customers per year could qualify for the utility rebate, the attached financial model includes results both with and without the rebates. If the County desires to replicate this program by awarding rebates of $2 per watt, it could provide significant incentives for relatively modest funding levels. For example, for $1 million in rebates, rebates could be provided for 500 kW AC of installed systems (for about 250 customers, 9 times as many residential customers as

[11] http://www.deseretnews.com/article/1,5143,705286801,00.html

would benefit from the existing utility rebate program). Such funding would result in nearly doubling the current installed base of net metered solar systems. If the rebate amount were $1 per installed watt, a megawatt of installed capacity could be encouraged, though the financial benefit to the solar owner would not be as great. As reflected in the results in Tables 1A and 1B, for a 2 kW homeowner-owned system, a $2 per AC watt rebate results in a $0.05/kWh or greater levelized cost reduction for the homeowner over the life of the system.

(e) **Voluntary solar RECs** – each project may generate renewable energy credits that can be sold on the voluntary market for green credits. Since the customer owns the RECs according to the net metering provisions of the Public Service Commission. The total dollar amounts for an individual homeowner each year are fairly small, but they could potentially be aggregated by the County to help reduce the installation costs for solar power systems or provide some rebates from the County. As of June 2009, voluntary RECs were advertised at between $0.035 and $0.10/kWh.[12]

(i) **Applicability to Salt Lake County** – in March 2008, Utah enacted The Energy Resource and Carbon Emission Reduction Initiative (S.B. 202) under which an objective was established for utilities to use renewable energy sources to account for 20% of its 2025 retail electric sales. While this law is similar in some ways to mandatory renewable portfolio standards (RPSs) in other states, the law is effectively optional, since it requires utilities to obtain renewable energy only to the extent that it is "cost-effective" to do so and provides for a final target but does not set intermediate standards for years prior to the target date. There are also no penalties prescribed for non-compliance with the target. (Utah Code 10-19-101 et seq. Utah Code 54-17-101 et seq.). SB 99, enacted in March 2009, gives authority to the Utah Public Service Commission to develop a RECs tracking system. Each solar-generated kWh of electricity counts as 2.4 kWh for the purposes of meeting the goal. As a result of the optional standard, under current conditions, the value of the mandatory renewable energy certificates (RECs) in Utah are likely to be very low in the future in the absence of additional state or Federal action, and there is currently no market in Utah for trading the credits (though there is a voluntary REC market described above). However, if some of the current Federal legislative proposals such as a Federal renewable energy standard or carbon regulation with a cap and trade are enacted, the result would likely be either substantially increased non-solar electricity prices or increased value for solar RECs or other environmental amenities such as carbon credits. For residential systems, since RECs are typically measured in kWhs, and sold as they are produced, individual residential installations are not likely to receive substantial revenues up-front from REC sales. If the County aggregated the sales revenues from the environmental amenities, including voluntary RECs, were sold through a broker, the County could pass through that value without cost as a RECs rebate to the residential customer.

2. Alternative Financing Models

Because solar power projects have little maintenance costs and no fuel costs, virtually all of the costs of the resulting power are incurred up-front. Therefore, the primary challenge is related to

[12] *See* www.goodenergy.com; www.b-e-f.org.

financing the purchase of the system. In the past, homeowners with sufficient personal credit may have been able to utilize either an unsecured credit line or a home equity line of credit to purchase solar power systems. In the current housing finance market, residential mortgage lenders are much less willing to finance solar installations on residences. Existing home equity lines are being reduced, and few lenders currently offer second mortgages. As a result, a number of states, localities and utilities have developed various financing programs to overcome these challenges and to expand financing opportunities to those with lower incomes and credit quality.

(a) **Berkeley Model** – Berkeley California has established a residential solar financing plan that allows homeowners to receive a loan for a portion of the value of a solar generation system, with the ability to repay that loan through a voluntary incremental property tax assessment over time. The ownership of the system and the liability for the loan conveys with the property.

(i) **Applicable Law** - California law provides for two forms of land-secured financing for homeowners: Mello-Roos bonds and Assessment bonds. For both forms of financing, the consent of the parcel owner is required, and a lien very similar to a property tax is placed on the parcel. The lien can be used to secure bonds or other forms of debt financing, and the lien is in first position ahead of any private mortgage lien. If the loan is not paid, the County assessor may foreclose on the parcel.

(ii) **Process** - A lien can be placed on a parcel equal to the cost of the solar installation, as long as the homeowner consents to the lien. The municipality can pledge taxes secured by the lien to service debt on a bond. The proceeds from the bonds can be used to either reimburse the homeowner or pay the solar system installer directly. The City of Berkeley has implemented the "Berkeley First" program, using a charter city adaptation of the Mello Roos law to provide 100% financing for solar installations. Berkeley formed a Special Tax District 2008-1 to fund residential solar and energy conservation installations on September 16, 2008, and the $1.5 million in pilot funding provided through a bank letter of credit is anticipated to fund about 40 projects. The initial funding allocation of $1 million was fully allocated to applicants within the first 9 minutes of availability.

(iii) **Bond issuance** - Bonds will be issued to cover the costs for each installation, and the bonds are secured by a pro rata allocation of the special taxes received from all parcels within the Special Tax District. Each bond issue is fully cross-collateralized with all participating parcels. Each bond has a 20 year term, with level debt service and full principal amortization. The interest rate is fixed at the time of issuance, and is estimated to be the greater of 1) 6.75% or 2) the 10 year Treasury Bond rate plus 3.25%.

(iv) **Homeowner benefits** - the homeowner gets 100% financing. The homeowner has no restrictions upon their ability to modify, relocate or remove the system. The parcel is security for the tax lien, not the system. The tax lien automatically transfers to any new owner of the parcel. There is no need to refinance the system upon sale of a home. The interest component of the tax lien is deductible on Federal income tax. Most homeowners deduct their entire property tax bill on their Federal income tax.

(v) **The challenge** – When Berkeley's program was initially conceived, it anticipated issuing taxable public debt, which would be used to lend to homeowners for the installation of residential solar systems. Because of the condition of the public financing markets in the past year, resulting in higher interest rates, Berkeley and other municipalities have struggled to obtain public financing at interest rate levels low enough to be financially advantageous for residential customers. There have been proposals discussed under which the U.S. Department of Energy would provide municipal loan guarantees to reduce the costs of similar programs to homeowners, but we are not aware of any such programs that have been enacted.

(vi) **Application to Salt Lake County** –Utah state law (See Utah Code § 11-42-102(22)) does not currently allow special tax districts or assessments to be applied to privately owned assets, and public financing may not be used to fund privately owned assets. A legislative change would be required for Salt Lake County to implement a program similar to Berkeley's program.

(b) **Boulder Colorado -** On May 28, 2009 a local improvement district created by Boulder County, Colorado issued $7.7 million of special revenue bonds payable from special assessments levied and collected by the county against the properties specially benefitted by the improvements financed with the bond proceeds. The projects financed with the bonds consist of various renewable energy and energy efficient improvements in residential properties that voluntarily consented to be included in the program. Approximately 381 property owners are participating in the project. Legislative changes would be required for Salt Lake County to implement a program similar to Boulder County. To the extent Salt Lake County desires to pursue these legislative changes, Ballard Spahr has copies of the amendments made to Colorado law.

(c) **New Mexico** is planning a similar property tax-funded model.

(d) **Connecticut Lease** – Connecticut has implemented a Solar Lease program.

(i) **Loan Amount, rate and terms -** The program allows a no money-down lease, with payments fixed for 15 years, at which point the customer may extend the lease for an additional 5 years at a reduced cost. The homeowner is responsible for paying all repairs and maintenance during the lease, including insurance. The system is owned by CT Solar Leasing LLC, which receives the tax benefits.

(ii) **Customer Eligibility -** eligible customers include residents of 1 to 4-family owner-occupied homes, whose household income is 200% or less of their area's median income, who meet the credit and debt to income qualifications of the program.

(iii) **Loan Repayment** – CT Solar Leasing LLC owns all RECs produced by the system, and aggregates the RECs into a reserve account to be used to pay operating costs of the system. Any amounts remaining in the account at the end of the lease is available to be used by the homeowner toward the purchase or removal of the system. *See* www.ctsolarlease.com for additional information.

(e) **New Jersey Lease (PSE&G)** – Public Service Electric and Gas (PSE&G) of New Jersey offers loans for "behind the meter" photovoltaic (PV) systems to all customer classes in its electric service territory.

(i) **Loan Amount, rate and terms** - the Solar Loan Program will provide loans covering 40-60%of the cost of PV systems with the remainder to be financed separately by the customer. A loan term of 15 years is available to non-residential customers at an interest rate of 11.11%, while residential customers are eligible for a loan term of 10 years at a 6.5% interest rate.

(ii) **Customer Eligibility** – the Loan Program is only available to customers eligible for net metering under the state rules.[13] Loan applications will be accepted for two years or until a goal of 30 MW of installed capacity is reached, whichever comes first (the program has been operating for . Loan availability will initially be divided into four segments, which each segment allocated a portion of the 30 MW overall goal. The breakdown is as follows: 1. Residential 6 MW, 2. Multi-family/Affordable Housing: 3MW, 3. Municipal/Non-profit: 9 MW, 4. Commercial and Industrial (C & I): 12 MW. Currently, loan allotments have hit a maximum, and there is no longer any loan availability.

(iii) **Repayment** - customers may repay the loan through cash payments or by signing over their Solar Renewable Energy Certificates (SRECs) to PSE&G. An SREC is equivalent to 1 MWh of solar electric generation under the state trading system, and although the value of an SREC will vary according to market conditions, PSE&G has set a floor price of $475 per credit ($0.475/kWh) for the repayment of loan principal and interest. Customers may elect to obtain the current SREC market price if the price is above that level.

(f) **Solar City Solar Lease** – Solar City, a private solar installer, offers a Solar Lease program, under which Solar City maintains ownership of the system and charges a single lease payment that covers the purchase of the power output and regular system maintenance. The lease is available for $0 down. Although the service is not available in Utah, in California, payments begin at $30/month for a 2.4 kW system, increasing at 3.9% per year during a 15 year lease term. This structure, similar to the Connecticut lease program, allows Solar City to utilize the Federal ITC and accelerated depreciation benefits as well as any state incentives such as state tax credits, rebates or RECs.

3. St. George

(a) The City of St. George Energy Services Department and Dixie Escalante Electric, the utilities serving St. George, Utah, have built a large solar photovoltaic (PV) facility, a community solar farm, and are allowing residents to purchase partial shares in the facility through the SunSmart program. Participation is sold in whole and half units of 1 kilowatt

[13] Under New Jersey's net metering rules, the maximum individual system capacity is 2 MW; there is currently no firm aggregate limit on net metering. http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NJ03R&state=NJ&CurrentPageID=1&RE=1&EE=1.

("kW") of installed solar PV capacity. A 1 kW "unit" on the SunSmart grid can be purchased for a one-time payment of $6,000, or a half-unit for $3,000. SunSmart estimates that one unit will generate power equal to approximately 15% of the average home's monthly power (or about 140 kWh per month). After the initial purchase, there are no additional costs of ownership. Customers may purchase up to 4 units or 8 half units, and a minimum output of 800kWhs a year is guaranteed for these units.

(i) **Power delivery** - the power generated by the SunSmart solar farm is not sent directly to individual homeowners – it is sent to one of the city's substations and then the power is transported throughout the community by means of existing distribution circuits. Participating customers receive a credit on their utility bill each month based on the energy their unit has produced.

(ii) **Ownership term** - purchasers of SunSmart will own the unit for a minimum of 19 years, equivalent to the life of an average solar panel as estimated by SunSmart. After 19 years, the customer will have the opportunity to pay the replacement cost, if any, and continue owning the unit, or make the unit available for others to purchase.

(iii) **Tax credits** - the person receiving the state tax credit must live in St. George and they must also be receiving credit for the energy generated. The state tax credit is available only to St. George residents since the bill that was passed last year contains a solar-specific provision that allows taxpayers to qualify for this credit if they purchase a solar project from a qualifying political subdivision, which includes the municipal utilities serving St. George.[14] Program participants may not claim the Federal residential solar tax credit which is available only for systems built on a residence - and includes "property which uses solar energy to generate electricity for use in a dwelling unit located in the United States and used as a residence by the taxpayer." (Internal Revenue Code § 25D(d)(2)).

(iv) **Transferability** – if a homeowner moves out of St. George, the system ownership will be transferred to the new resident, but if the customer moves within St. George, the customer has the option to take the ownership of the unit to the new residence, or "sell" it with the existing home.

(v) **System** - the total installed system capacity for the community solar farm is currently 100 kW. To date, 26.5 kW have been sold, and the City has applied for stimulus funding to expand the project to 250 kW. Additional information is available at: http://www.sgsunsmart.com/

4. Murray Utility Opportunity – The St. George model described above is widely recognized as a quasi-homeowner-owned business model. With some variations, a

[14] The new provision allows taxpayers to qualify for the state tax credit for renewable energy systems if they purchase a solar project from a qualifying political subdivision. Cities, towns, Interlocal entities, and special service districts are all qualified political subdivisions, and . See Utah Code § 59-10-1024.

structure could be designed for Murray Utility that would take advantage of the state and Federal financial incentives for solar power. One possible structure would be the following:

(a) **Murray Utility** – to qualify for the program, a residential customer must be served by the Murray City Municipal Utility, which would administer the program.

(b) **Differences from St. George** –under the St. George SunSmart program, the Federal tax credits available for solar projects are not utilized. The project does not appear to qualify for the solar residential credit (*see* Internal Revenue Code § 25D) or the commercial solar investment tax credit (the "ITC"; *see* Internal Revenue Code § 48) since the project when placed in service was owned by a non-taxpaying entity. The project also does not receive the accelerated depreciation benefits that would be available if the solar project were owned by a private party. As a result, the costs of the program to residential customers is quite high, as shown in Table 1A.

(i) **Private partner** – the key to benefitting from the state and Federal tax benefits available for solar projects is to arrange for the project to be financed, constructed and owned by a private party that is eligible to obtain the Federal ITC, accelerated depreciation, and the state income tax credit[15] and to enter in to a long-term power purchase agreement with the system owner. The Murray Utility is ideally situation to be a purchaser under such a power purchase agreement. The Murray Utility could then implement a program similar to the Blue Sky Renewable Energy program by allowing its customers to "purchase" the output from 1 kW portions of the system, or on a kilowatt-hour basis.[16] Rocky Mountain Power's program allows customers to purchase 100 kWh blocks of "clean" energy for a premium (in addition to the customer's regular rates) of $1.95.[17] The residential customer would not be eligible for any state or Federal tax incentive or rebate under this arrangement, but because of the economies of scale and utilization of multiple tax incentives, the costs to consumers for the program would be between $0.02 and $0.09 / kWh as an incremental addition to the utility bill. Since the solar rebate is administered by Rocky Mountain Power, under this structure, the project would not qualify for the rebate.

(ii) **Utility** – To take advantage of the economies of scale in the community solar farm, the municipal utility could pre-wire the site and simplify the interconnection process. At that point, the Murray Utility could identify private developers to build, own, and operate the system in order to take advantage of the state and Federal tax

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15 The Utah state corporate tax credit for renewable energy systems is equal to 10 percent of reasonable system costs for solar power systems, up to $50,000. Utah Code § 59-7-614.

16 Although the customers would benefit from the production of green energy, there is no direct electrical connection between the solar panels at the Murray Utility solar farm and the residential customer, nor would the customer be an owner of any portion of the system.

17 *See* http://www.rockymountainpower.net/Article/Article65531.html.

incentives available to system owners. If possible, the site location should be in a New Markets-eligible location to qualify for low-interest financing available through the New Markets Tax Credit structure, which would further reduce costs.

Summary of Obstacles to Residential Solar Financing

1. **Total Utility Rebate Funding** – as noted, the aggregate amount devoted tot his program is only sufficient to fund about 28 customer installations of solar panels. Unless funding is increased dramatically, or additional sources of funds are identified, the sizeable incentive provided by this rebate will be limited to too few customers to have any measurable impact. In the financial model described herein, the rebate had about a $0.05/kWh improvement on the cost of solar power for residential customers, a significant impact.

2. **Lack of Other State Incentives** – in addition to the issues outlined above, without a binding renewable portfolio standard and a tradable market for renewable energy certificates (RECs) used for compliance with that standard, Utah will be a less favorable location for the development of solar projects than other nearby states such as Colorado, Nevada, Arizona, and California.

3. **Barriers to Berkeley / Boulder-style Program** – as noted above, Utah law does not currently allow for property-tax or special assessment financing of solar energy property on homeowner's property, regardless of whether the property is owned by the homeowner or a nongovernmental third-party.

4. **Third-party Ownership** – the third-party ownership issue is widely noted because it is a barrier to commercial solar projects, but is only applicable to residential projects for providers offering power purchase agreements ("PPAs") to residential customers. The PPA model for residential customers is not widespread, and would not be possible in Utah under current law, though the lease model described in this report is an option for Utah residential customers.

Third-party ownership analysis of financing options

1. **St. George** – since owners of shares in the program do not qualify for Federal tax incentives, the program is much less cost-effective than it could be. The primary benefit is the economies of scale produced by purchasing the system in bulk. However, government entities in the State of Utah qualify for wholesale solar equipment purchases and any locality could obtain a similar economy of scale. The St. George program suffers from a lack of financial incentives, and low power prices make it difficult for residents to justify the added expense of solar power, which explains why the program, which went operational in January 2009, has sold only 26.5 kW as of June 17, 2009. As noted in the alternative structure proposed above, there are other possible ways to obtain the benefits of the economies of scale without losing the value of the tax incentives.

2. **New Markets Tax Credits** – New Markets Tax Credits may be used to lower the costs of solar power projects in one of two ways: (i) providing low-interest financing for community solar farms similar to the St. George program as long as the community solar

farms are located in eligible census tracts, or (ii) to establish a low-interest loan fund to be used by individual customers. A similar program has been established for dispensing low-level small business loans at below-market rates, offering 25-year loan terms for loan amounts between $500,000 and $2 million. In either case, if the system is owned by a third-party, although the tax benefits increase substantially compared to a system owned by a resident, the sale of electricity from either a community solar farm or individual residential solar installation owned by a third-party could subject that party to regulation as a public utility. For more details on Maine's program, *see* http://www.bangor.com/uploadedFiles/PDFs/Maine%20New%20Markets%20Loan%20Fund%20-%20Press%20Release.pdf.

3. **Net metering** – under Utah's net metering statute, only solar energy systems that are utility customer-owned or leased are eligible for net metering. This current structure of net metering disfavors some third-party ownership and favors the lease arrangement for individual residents since they may still claim the individual state income tax credit for solar projects. *See* Utah Code § 54-15-102. Murray Utility has also voluntarily implemented a net metering program. (*See* http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=UT11R&re=1&ee=1)

4. **RMP Rebates** – the solar rebate program offered by Rocky Mountain Power requires that eligible systems be net metered. Since net metering rules currently preclude third-party ownership of systems in some cases, systems owned by third-parties, unless leased to customers, would not be eligible for the rebate program.

5. **Lease Options** – because the Utah state income tax credit may be claimed by a lessee of solar property, a resident who leases solar property from an entity claiming the Federal ITC and accelerated depreciation, may claim the state income tax credit on the principal amount repaid each year, directly reducing the costs to the resident. Alternatively, the system owner under a lease structure could claim the credit rather than the resident. Although the sale of electricity to customers by third parties in Utah may subject the seller to regulation as a public utility, leasing solar equipment to customers should not subject the lessor to such regulation.

Table 1A: Examples of Pricing Under Alternative Customer-Sited Scenarios

Option	Net Levelized Cost[18] with rebate	Net Levelized Cost with rebate & NMTC Financing	Net Levelized Cost without rebate or NMTC Financing	Up-front Costs to Customer
Residential Ownership Base Case (no RECs, no Equity Loan Interest Deduction) ($7,500 / kW)	$0.098 / kWh	NA	$0.164 / kWh	Financing Dependent
Residential Ownership (with RECs, Equity Loan Interest Deduction**) ($7,500 / kW)	$0.043	NA	$0.092	Financing Dependent
Residential Solar Lease Base Case (no RECs, no Bonus MACRS) ($7,500 / kW)	$0.032	$0.006	$0.104	None
Residential Solar Lease (with RECs and Bonus MACRS) ($7,500 / kW)	$0.007	($0.017)	$0.076	None
St. George Solar Farm Model Base Case (no Federal ITC, RECs) ($6,000 / kW)	$0.109	NA	$0.204	Financing Dependent
St. George Solar Farm Model (with RECs) ($6,000 / kW)	$0.096	NA	$0.187	Financing Dependent

*Net levelized cost is the cost of the average kWh throughout the life of the system, above what a residential customer would be expected to pay to their current utility provider, for the life of the system, and incorporates the incentives described above. If the net levelized cost is $0.00 then the system would be expected to cost exactly the same as the expected utility costs for the life of the system, and a negative number represents an expected savings from anticipated utility costs. System costs of $7.50 / watt are assumed for individual systems and costs of $6.00 / watt are assumed for community solar farms. Both estimates are based on recent market research.
**The model for home equity financing that is tax deductible and financing obtained through a special assessment on property (similar to the Berkeley model) is identical.
Financing Dependent amounts listed above mean that in cases financed by the resident, if less than 100% of the system is financed by the homeowner, the remaining purchase price must be paid by the resident. There may also be additional short-term borrowing required until the state or federal tax benefits are realized in such cases. Lease providers often offer either 100% financing or provide for partial down-payments. The St. George model requires that the customer pay for the system. Assuming the customer finances the system, a down payment may be required.

[18] Net levelized cost is the cost of the average kWh of electric output throughout the life of the system, above what a residential customer would be expected to pay to their current utility provider, for the life of the system, and incorporates the incentives described in each specific case in this report. If the net levelized cost is $0.00 then the system would be expected to cost exactly the same as the expected utility costs a resident would pay during the time the system is expected to generate power, and a negative number represents an expected savings from anticipated utility costs.

Table 1B: Examples of Pricing Under Murray Utility Scenarios

Option	No Rebate Included	Net Levelized Cost with NMTC Financing	Net Levelized Cost without rebate or NMTC Financing	Up-front Costs to Customer
Murray Solar Farm Base Case (no RECs or Bonus MACRS) ($6,000 / kW)	NA	$0.048	$0.087	None
Murray Solar Farm (with RECs and Bonus MACRS) ($6,000 / kW)	NA	$0.024	$0.062	None

Explanatory Note for All Results: All estimates are based on a 2 kW system. In the case of the Murray Solar Farm case, the estimate is based on the output from 2 kW of a larger system, though the system is not sold or leased to residential customers. The value used for RECs in the model was $0.03/kWh and additional value was estimated for carbon credits (slightly over one cent/kWh). The value of the Federal investment tax credit (ITC) is 30% of the installed costs, and bonus depreciation combined with accelerated depreciation results in over 50% of the costs being deducted in the first year of the system's life. State income tax credit of 25% of system cost up to $2,000 is calculated for all systems, with the basis reduced due to the Federal tax benefits. Rebates are calculated based on $2/watt AC, up to $6,000 for a residential system. The equity loan interest deduction reflects the value to a homeowner of being able to deduct the interest payments on a loan for the system financed through a home equity loan. Property taxes are assumed to be paid for third-party owned systems, but not for systems owned by residential customers.